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ASSEMBLY AND ANALYSIS OF SAR/LANDSAT DATA SETS

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The objectives of this study include the evaluation and, where necessary, the development of techniques to prepare synthetic aperature radar (SAR)/LANDSAT data sets for computer processing, and to provide the earth resources community with access to this technology; the assembly of well-calibrated SAR/LANDSAT data sets for demonstration purposes for several applications; and the analysis of SAR/LANDSAT data sets in order to identify and quantify the contribution of the SAR channel. One data set has been assembled and analyzed, while a second, better, data set is being assembled. Another current activity is the definition of procedures to establish a capability to assemble SAR/LANDSAT data sets at Purdue/LARS for the casual experimenter. The first data set consisted of four channels of LANDSAT imagery and one channel of SAR imagery acquired August 30, 1973. The SAR was a Goodyear Aerospace AN/APQ102A flown on a United States Air Force RF-4 aircraft. The scene selected for analysis was a portion of the Delmarva Peninsula and the selection of this particular scene was based on experience with the misclassification problem with urban areas and certain beach and field areas which resulted when LANDSAT imagery only was used. The selected scene was entered into the LARS library where it was clustered by use of the LARSYS CLUSTER. These classes, and the resulting statistics, were based on the five channel data set. However, the SAR imagery contained scratches which interfered with a complete analysis of the scene. An urban class did not exist as a separable class or set of subclasses when the SAR channel was not included. However, with the addition of the SAR channel, three different classes associated with urban areas were readily separable using only the four LANDSAT channels. Also, areas previously misclassified as urban using LANDSAT only can be separated into two classes, both of which are then clearly not urban, when the SAR channel is used. One of the urban classes is related to the high return from cultural targets, e.g., bridges and large buildings. This type of target, although often not detectable in the LANDSAT data, is enhanced by the SAR channel. The second data set is being assembled and a 10 x 30 mile area will be intensively analyzed. This test area is also a portion of the Delmarva Peninsula, and the targets of interest are corn and soybeans. This data set will be resampled to both 25 and 50 meter resolution, and the analysis will attempt to identify contributions of the SAR channel and the effects of resampling.